PROJECT NUMBER : 6908
PROJECT TITLE : Smoke Condensate Studies
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I. REDUCTION OF MS TSNA BY INHIBITING THE PYROSYNTHESIZED TSNA

A. Objective: Reduce the levels of pyrosynthesized MS TSNA by blocking reaction pathways which form TSNA.

B. Results: Oriental (Or) fraction #1 (insolubles) and n-docosyl stearate (DcS) were applied to SCF-Bu filler (J0BFO) in an attempt to reduce the MS delivery of TSNA. Or fraction #1 consists primarily of saturated high molecular weight hydrocarbons and DcS is a high molecular weight waxy ester. Both treated fillers showed reductions in TSNA relative to the control SCF-Bu but Or fraction #1 was much more effective. Reductions with Or fraction #1 were 42%, 73%, and 39% for NNN, NAT, and NNK respectively while DcS gave reductions of 24%, 39%, and 28%. Since SCF-Bu was used as the base substrate and the preformed TSNA have been removed in the SCFE treatment, the observed reductions are attributed to inhibition of TSNA pyrosynthetic mechanisms.

C. Plans: Additional smoking experiments with other Or fractions are in progress.

D. References:

Haut, S. A. Notebook No. 8891, p. 170.

II. ANALYTICAL PROCEDURES

A. Objective: To develop and maintain analytical methodology for TSNA or other compound classes where information is needed for determining relationships of TSNA to their precursors.

B. Results: Work continued on the development of a satisfactory smoke collection procedure for aged SS smoke. As was reported last month, the NaOH backwash step used in the normal nitrosamine workup procedure removed significant amounts of NA's when small amounts of smoke are present in the collected sample. This problem prevented testing of the new C-frit traps found to be satisfactory for collection of unaged SS smoke on the SAVA smoking machine. Tests were conducted this month using a modified sample workup procedure (elimination of the NaOH step) and the results indicated that this procedure rectified the nitrosamine loss problem. Tests were also conducted using a modified buffer (MB) solution in the collection traps to test for possible artifactual nitrosamine formation in the traps. The MB solution had an increased buffer capacity to prevent pH changes during collection and an increased ascorbic acid content. Both MB and standard buffer (SB) solutions were tested with and without added amine spikes (piperidine and

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anatabine). The results of these tests showed that the new C-frit traps are satisfactory for collection of aged smoke and that artifactual nitrosamine formation in the traps is not a problem and that use of the standard buffer is acceptable.

Method development for pseudooxynicotine and N-methylmyosmine (PsON/NMM) in filler using the GC/MSD continued. Calibration was expanded from a single point calibration to a multi-level calibration. Experiments to determine the effects of solvent, mesh size of ground filler, filler to solvent ratio, and extraction time were outlined. The majority of time this month was concentrated on the extraction solvent. Preliminary results indicate that basic methanol is the best solvent. Four bases at four different concentrations are under investigation to ascertain the best base and concentration to be used.

C. Plans: Extend the study of collection methods to solid phase traps. Continue development of the PsON/NMM method.

D. References:

Morgan, W. R. Notebook No. 8905, pp. 28-29.

Keene, C. K. Notebook No. 9067, p. 30.

III. UNEXTRACTED NICOTINE STUDIES

A. Objective: To determine whether there is a correlation between unextracted nicotine in filler and the delivery of NNK in the corresponding MS smoke.

B. Results: Work continued on optimizing the digestion procedure for liberation of Nic-X from burley CEL. The mild digestion procedure (1N NaOH at 40°C for 18 hours) reported last month has been adopted as the method of choice for all future digestions of CEL. Procedures for digestion of ART burley filler were begun.

C. Plans: Continue evaluation of the ART burley filler method.

D. References:

Lambert, E. A. Notebook No. 8852, p. 191.

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